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On 1-28-05

TOWNSEND and TOWNSEND and CREW LLP

By: Linda Shaffer

PATENT
Docket No.: 016866-001503

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

T. William Hutchens *et al.*

Application No.: 09/123,253

Filed: July 27, 1998

For: METHODS AND APPARATUS FOR THE DESORPTION AND IONIZATION OF ANALYTES

Customer No. 20350

Confirmation No. 5339

Examiner: Lyle Alexander

Art Unit: 1743

DECLARATION OF SCOT R. WEINBERGER UNDER 37 CFR § 1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, Scot R. Weinberger, being duly warned that willful false statements and the like are punishable by fine or imprisonment or both, under 18 U.S.C. § 1001, and may jeopardize the validity of the patent application or any patent issuing thereon, state and declare as follows:

1. All statements herein made of my own knowledge are true, and statements made on information or belief are believed to be true and correct.

2. I am currently the Director of Research Proteomics at Ciphergen Biosystems, Inc., Fremont California. Prior to that, I have held the following positions: (1) Matrix-Assisted Laser Desorption Ionization ("MALDI") Product Manager; (2)

Principal MALDI Research Scientist for the Hewlett Packard Company, Palo Alto, Ca.; (3) Vice President of Research and Development for Linear Scientific Inc., Reno, NV; (4) Capillary Electrophoresis R/D Group Leader for Spectra Physics, Inc., San Jose, Ca.; and (5) Applications Manager for Linear Instruments, Reno, NV.

3. I hold a BS degree in Cellular Biology from the University of Nevada Reno. My graduate studies included medical training at the University of Nevada School of Medicine, and Ph. D. studies in Physical Biochemistry at the University of Nevada Reno, Department of Biochemistry.

4. My current research interests are in the fields of protein biochip technology, surface enhanced laser desorption/ionization technology, matrix assisted laser desorption/ionization technology, time-of-flight mass spectrometry, and micro-separation techniques. As one of the pioneering instrument developers for micro-scale HPLC, capillary electrophoresis, and MALDI-TOF MS technologies, I have numerous patents in these disciplines along with many publications and presentations. My *Curriculum Vitae* is attached as Exhibit A.

5. I have reviewed and analyzed the above-referenced patent application, and I am familiar with the contents therein.

6. I have read the Office Action dated October 1, 2004 received in the present case, and I have reviewed and analyzed the references cited therein by the Examiner.

WESTLAKE/BRODBELT

7. The Examiner has rejected various claims under 35 U.S.C. § 102(e) as allegedly being anticipated by Westlake *et al.* (U.S. Patent No. 5,317,932). In particular, the Office Action (page 2, line 6) contains the following statement:

> "Westlake *et al.* in column 2 lines 10-17 characterize Brodbelt *et al.* as teaching a mass spectrometric

determination of in vivo analytes by use of a single nylon sample probe."

8. However, for the reasons set forth below, the Examiner's concerns are overcome. I believe the Examiner's Section 102(e) rejection of the claims is based on an apparently improper understanding of the Brodbelt publication (Brodbelt *et al.*, *Analytical Chemistry*, *59*:454-457 (1987)).

9. Brodbelt refers to the use of a gas chromatograph mass spectrometer (GCMS) that was modified to allow a gas inlet system (*see*, Brodbelt *et al.*, page 455, right column, paragraph beginning “Apparatus”). Brodbelt describes the use of a Teflon tube that connects a “probe” to the inlet of the mass spectrometer. The “probe” referred to by Brodbelt is sutured into the skin of a rat. The tube apparently transports blood gas from the “probe” into the mass spectrometer (*see*, page 455, left column, paragraphs beginning “In this paper…” and “Probe.”)

10. Brodbelt fails to disclose several elements of the claimed invention. First, it does not describe a time-of-flight laser desorption mass spectrometer or its use. Second, the “probe” is not a mass spectrometry probe as that term is understood by persons skilled in the art of mass spectrometry. In common usage, a “mass spectrometry probe” is solid support on which a sample is placed and which is introduced into the mass spectrometer, where the sample is desorbed and ionized from the probe. That is not the case in Brodbelt. The “probe” is not meant to be inserted into a mass spectrometer of any kind. Rather, the “probe” is inserted into an animal. Because it lacks several elements of the present claims, the Westlake and Brodbelt references did not anticipate the invention.

BENNINGHOVEN *ET AL.*: DE 3221681

11. The Examiner has rejected various claims under 35 U.S.C. § 103(a) as allegedly being obvious over DE 3221681 (Benninghoven *et al.*). However, for the reasons set forth below, the Examiner's concerns are overcome.

12. The Benninghoven *et al.* reference describes a mass spectrometer with an external sample holder. The sample holder is described as a "thin, polymeric carrier foil (thickness ca. 0.1 μm)" (*see*, translation of Benninghoven *et al.*, page 5, third full paragraph). This foil is designated #3 in the figures. The patent states further: "Purposefully, the polymeric carrier foil is mechanically stabilized by a network or a lattice or by a one or more hole baffle (*see*, page 5, fourth full paragraph). A sample is placed on this carrier foil and the foil "rests on sample holder [16]" (*see*, page 9, first full paragraph). The sample holder is contiguous with an opening in the mass spectrometer into which ions are to be introduced. The patent indicates that a laser strikes the back side of the foil, desorbing and ionizing the analyte from the front of the foil, where the analyte enters the mass spectrometer (*see*, *e.g.*, page 8).

13. The present invention is distinguishable from the Benninghoven *et al.* device in several ways. First, the probe of the present invention is "rigid and structurally self-supporting." The foil carrier described by Benninghoven *et al.* is thin (0.1 μm) and needs to be "mechanically stabilized," apparently relying on a separate large metallic holder for both structural and functional support. Therefore, in my opinion, the polymeric foil of Benninghoven *et al.* is not "rigid and structurally self supporting" as the claims require.

14. Second, the laser in the Benninghoven *et al.* reference strikes the foil from the back surface, desorbing analyte positioned on the front surface. In contrast, the method of this invention requires exposing the analyte to the laser on the "sample presenting surface" which is to say, on the opposite surface as that exposed in the Benninghoven *et al.* reference.

15. Third, the thin polymeric film of Benninghoven *et al.* is kept ***outside*** of the mass spectrometer. In fact, the Benninghoven *et al.* patent claims this placement outside of the mass spectrometer to be an advantage. In contrast, the present claims require the probe to be "removably insertable" into a mass spectrometer.

16. In my opinion, the disclosure of the Benninhoven *et al.* reference did not render the present invention obvious. The teachings of Benninghoven *et al.* are motivated by their desire to keep the sample presenting surface outside of the mass spectrometer chamber so as to avoid exposing the analyte to a vacuum. The polymeric foil is thin so that a laser, located outside the mass spectrometer, can strike the back side of the foil, penetrate the foil and desorb analytes on the front side of the foil which faces the opening to the mass spectrometer. The present claims are directed to methods and devices in which the probe is inserted into a mass spectrometer, and a laser strikes the sample presenting surface of a probe to desorb and ionize the analytes. A person of ordinary skill in the art performing laser desorption mass spectrometry would have had no motivation to make a probe of a thin polymer that through which a laser can pass because the laser strikes the sample presenting surface of the probe and is not intended to penetrate the probe. Accordingly, this reference teaches away from using a polymeric foil as a sample carrier in a laser desorption/ionization mass spectrometer.

17. Furthermore, the carrier foil of Benninghoven *et al.* does not appear to be rigid and self supporting, as the claims require. I believe that a person of ordinary skill in the art of mass spectrometry would have recognized that a nonrigid or self-supporting material is not appropriate for removably inserting into a laser desorption/ionization mass spectrometer. Therefore, in my opinion, there would have been no motivation to use the thin polymeric foil of Benninghoven *et al.* as a removably insertable probe for laser desorption/ionization mass spectrometry.

18. In sum, several elements of the claims are missing in the Benninghoven *et al.* reference, and it would not have been obvious to alter the probe of Benninghoven *et al.* to incorporate the missing elements or to use the probe as described

in the present claims. Therefore, I do not believe that the Benninhoven *et al.* reference made the invention obvious to one of ordinary skill in the art.

CERAMI: U.S. 4,665,192

19. The Examiner has rejected various claims under 35 U.S.C. § 103(a) as allegedly being obvious over Cerami. However, for the reasons set forth below, the Examiner's concerns are overcome.

20. Cerami describes a "double deflection mass spectrometer modified for optimal chemical ionization operation" (column 11, lines 48-50). This device uses a ceramic probe to provide a solid support to pyrolize samples dried upon the probe. Pyrolysis results in desorption of the analyte from the probe as neutral gas phase molecules. Ceramic was chosen as a probe material in particular because it has a high thermal conductivity, useful in pyrolysis. The neutral gas phase molecules are subsequently ionized by either chemical ionization or electron impact ionization. The ionized molecules are then analyzed by magnetic sector mass spectrometry.

21. In my opinion, a person of ordinary skill in the art of mass spectrometry would not have been motivated to use a ceramic probe for sample presentation in laser desorption/ionization time-of-flight mass spectrometry. First, ceramic is adapted for use in chemical desorption, which requires high heat. That is not the case in laser desorption. Furthermore, at the time the subject patent application was filed persons of ordinary skill in the art of mass spectrometry believed that the introduction of nonconductive materials, such as ceramic or the elements mentioned in the claims, would interfere with the electric field of a time-of-flight device so as to impair the ability to detect desorbed/ionized analytes. Therefore, it would not have been obvious to use ceramic or the materials mentioned in the claims as part of a mass spectrometry probe in laser desorption/ionization time-of-flight mass spectrometry.

CERAMI or WESTLAKE in view of STUKE (U.S. 4,686,366)

22. The Examiner has rejected various claims under 35 U.S.C. § 103(a) as allegedly being obvious over Cerami or Westlake in view of Stuke (U.S. Patent No. 4,686,366). The Examiner said that Stuke disclosed a laser desorption/ionization mass spectrometer and that it would have been obvious to modify Cerami or Westlake to obtain the advantages of Stuke. However, for the reasons set forth below, the Examiner's concerns are overcome.

23. As I described above, it is my opinion that it would not have been obvious to use the probe of Cerami in a laser desorption/ionization time-of-flight mass spectrometer as described by Stuke. In particular, persons of ordinary skill in the art would have believed that the use of nonconductive materials such as ceramic or the materials mentioned in the claims would have interfered with the electric field of a time-of-flight device so as to impair the ability to detect desorbed/ionized analytes. Therefore, it would not have been obvious to use the probe of Cerami in a laser desorption/ionization time-of-flight mass spectrometer, as required by the claims.

24. Furthermore, it is my opinion that it would not have been obvious to one of ordinary skill in the art to use the probe of Westlake/Brodbelt in a laser desorption/ionization mass spectrometer. The "probe" of Brodbelt is not a mass spectrometry probe at all, but a probe to be inserted into an animal to sample blood gas. The Brodbelt "probe" is not designed for presenting a sample to a laser desorption/ionization source. Rather, the "probe" is used to collect a sample that is then transmitted by other means (a Teflon tube) to the inlet of a modified gas chromatograph mass spectrometer. In my opinion, anyone of ordinary skill in the art of mass spectrometry would have recognized that the Brodbelt "probe" is not appropriate for use in laser desorption/ionization time-of-flight mass spectrometer and could not be modified

PATENT

for use as such. Therefore, it is my opinion that the present invention would not have been obvious over Westlake/Brodbelt in view of Stuke.

The declarant has nothing further to say.

Scot R. Weinberger

1- 27-05
Date

Curriculum vitae for Scot R. Weinberger

Scot R. Weinberger is currently the Director of Research Proteomics at Ciphergen Biosystems, Inc., Fremont California. Prior to that he served as MALDI Product Manager and Principal MALDI Research Scientist for the Hewlett Packard Company, Palo Alto, Ca.; Vice President of Research and Development for Linear Scientific Inc., Reno, NV; Capillary Electrophoresis R/D Group Leader for Spectra Physics, Inc., San Jose, Ca.; and Application's Manager for Linear Instruments, Reno, NV.

Scot received a BS in Cellular Biology from the University of Nevada Reno. His graduate studies included medical training at the University of Nevada School of Medicine, and Ph D. studies in Physical Biochemistry at the University of Nevada Reno, Department of Biochemistry.

Scot's current research interests are in the fields of protein biochip technology, surface enhanced laser desorption / ionization technology, matrix assisted laser desorption / ionization technology, time-of-flight mass spectrometry, and micro-separation techniques. As one of the pioneering instrument developers for micro-scale HPLC, capillary electrophoresis, and MALDI-TOF MS technologies, Scot has numerous patents in these disciplines along with many publications and presentations. His current contact information is:

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EXHIBIT

A

Scot Weinberger Patent Portfolio:

Patent	Year	Title
EP01018144A1	2000	Secondary Ion Generator Detector for Time-of-Flight Mass Spectrometry
WO09916103A1	1999	Secondary Ion Generator Detector for Time-of-Flight Mass Spectrometry
US05777325	1998	Device for Time Lag Focusing Time-of-Flight Mass Spectrometry
US05463800	1997	Method of Preparing a Sample for Analysis by Laser Desorption Ionization Mass Spectrometry
US05594243	1997	Laser Desorption Ionization Mass Monitor (LDIM)
WO09509688A1	1995	Sample Preparation System and Method
US05382793	1995	Laser Desorption Ionization Mass Monitor (LDIM)
EP00629313A1	1994	Laser Desorption Ionization Mass Monitor (LDIM)
WO09318537A1	1993	Laser Desorption Ionization Mass Monitor (LDIM)
US05221448	1993	Buffer Gradient and Temperature Gradient Capillary Electrophoresis
US05066382	1991	Thermal Control for Capillary electrophoresis Apparatus
US05053115	1991	Automated Neutral Marker for Capillary Electrophoresis

US05047134	1991	Buffer Gradient and Temperature Gradient Capillary Electrophoresis
US05043928	1991	Resampling System Using Data Interpolation to Eliminate Time Effects
US05037523	1991	Air Cooled Cartridge for Capillary Electrophoresis
US05021646	1991	Remote Optical Path for Capillary Electrophoresis Instrument

Scot R. Weinberger Publications:

Recent advancements in surface-enhanced laser desorption/ionization-time of flight-mass spectrometry. Merchant, Maggie; Weinberger, Scot R. Ciphergen Biosystems, Inc., Palo Alto, CA, USA. Electrophoresis (2000), 21(6), 1164-1177

Protein chip array strategies for differential protein display: Retentate maps of molecular recognition diversity. Weinberger, Scot R.; Yip, Tai-Tung; Thatcher, Bradley J.; Pham, Thang T.; Hutchens, T. William. Ciphergen Biosystems Inc., Palo Alto, CA, USA. Book of Abstracts, 217th ACS National Meeting, Anaheim, Calif., March 21-25 (1999)

Unknown Peptide Sequencing Using Matrix-Assisted Laser Desorption/Ionization and In-Source Decay. Reiber, Duane C.; Brown, Robert S.; Weinberger, Scot; Kenny, James; Bailey, Jerome. Department of Chemistry and Biochemistry, Utah State University, Logan, UT, USA. Anal. Chem. (1998), 70(6), 1214-1222

Functional Wave Time-Lag Focusing Matrix-Assisted Laser Desorption/Ionization in a Linear Time of Flight Mass Spectrometer: Improved Mass Accuracy. Whittal, Randy M.; Russon, Larry M.; Weinberger, Scot R.; Li, Liang. Department of Chemistry, University of Alberta, Edmonton, AB, Can. Anal. Chem. (1997), 69(11), 2147-2153.

Accurate mass measurement of oligonucleotides using a time-lag focusing matrix-assisted laser desorption/ionization time-of-flight mass spectrometer. Dai, Yuqin; Whittal, Randy M.; Li, Liang; Weinberger, Scot R.. Dep. Chem., Univ. Alberta, Edmonton, AB, Can. Rapid Commun. Mass Spectrom. (1996), 10(14), 1792-1796

Glycoprotein analysis using enzymatic digestion and MALDI-TOF MS. Kornfeld, Rich; Kenny, James; Weinberger, Scot; Yang, Yi; Orlando, Ron. California Analytical Division, Hewlett-Packard Company, Palo Alto, CA, USA. Proc. SPIE-Int. Soc. Opt. Eng. (1996), 2680(Ultrasensitive Biochemical Diagnostics), 397-405.

The laser desorption-ionization mass monitor: a powerful analytical tool for life science investigations. Weinberger, Scot R.. Quantum Achiev., Reno, NV, USA. Am. Lab. (Shelton, Conn.) (1992), 24(5), 54, 55-8. CODEN: ALBYBL ISSN: 0044-7749.

Scanning ultraviolet detection in capillary supercritical fluid chromatography. Weinberger, Scot R.; Bornhop, Darryl J. Linear Instrum. Corp., Reno, NV, USA. J. Microcolumn Sep. (1989), 1(2), 90-5. CODEN: JMSEEJ ISSN: 1040-7685.

A Critical Evaluation of Multiple Wavelength Photometric Absorbance Monitors for Liquid Chromatography, S. R. Weinberger, H. Hlousek; International Labmate, vol. XII, issue 4, 1988

Part two. Design of an LC detector. Carver, David R.; Weinberger, Scot R.; Hlousek, Louis. Dep. Chem., Virginia Polytech. Inst. State Univ., Blacksburg, VA, USA. Am. Lab. (Fairfield, Conn.) (1987), 19(10), 57-8, 60, 62, 64. CODEN: ALBYBL ISSN: 0044-7749. Journal written in English.

Design of an LC detector: part one. Carver, David R.; Weinberger, Scot R.; Hlousek, Louis. Dep. Chem., Virginia Polytech. Inst. State Univ., VA, USA. Am. Lab. (Fairfield, Conn.) (1987), 19(5), 64, 66, 68-71

Scot R. Weinberger Scientific Presentations / Posters:

A New Detector for Liquid Chromatography, oral presentation, Pittsburgh Conference, 1987

A Critical Evaluation of Multiple Wavelength Monitors for LC, oral presentation, AOAC, 1988

A Versatile High Sensitivity, Full Spectral Scanning, Ultraviolet Absorbance Monitor for HPLC and HPCE, oral presentation, Pittsburgh Conference, 1988

A Novel Method for Determining the refractive Index of Commonly Used Solvents and Solvent Mixtures for Liquid Chromatography, poster, HPLC, Washington DC, 1988

Optical Considerations for "On-the-Fly" U.V.-Visible Scanning for High Performance Capillary Electrophoresis, poster, HPCE, Boston, Massachusetts, 1989

Optical Considerations for "On-the-Fly" U.V.-Visible Scanning for High Performance Capillary Electrophoresis, oral presentation, Pittsburgh Conference, New York, New York, 1989

Scanning UV-Vis Analysis of Coumarins and Flavinoids Isolated by High Performance Liquid chromatography from Persistent Leaves of Artemisia (subgenus Tridentate, Asteraceae), poster, HPLC, Stockholm, Sweden, 1989

A New, Fully Automated Instrument for Capillary Electrophoresis, oral presentation, Pittsburgh Conference, Chicago, Illinois, 1990

Multiple Wavelength Detection in Capillary Electrophoresis, poster, HPCE, 1990

Buffer and Temperature Gradients in Micellular Electrokinetic Chromatography, poster, HPLC, 1990

Open Tubular Capillary Electrophoresis of Protein Tryptic Digest, oral presentation, National Institute of Cancer, CE Meeting, Fort Dietrick, MD, 1990

Optical Detection Methods in Capillary Electrophoresis, Oral Presentation, National Institute of Cancer CE Meeting, Fort Dietrick, MD, 1990

Considerations for Open Tube CE of Proteins and Peptides, oral presentation, ASTM Committee E-19 Meeting, Pittsburgh, 1990

Multiple Wavelength Detection in Capillary Electrophoresis, oral presentation, HPCE, 1991

Gel Filled Capillaries for DNA Analysis by High Performance Capillary Electrophoresis, poster HPCE, 1991

The Role of the Cathode Buffer in Open-Tube Capillary Electrophoresis, poster, HPCE, 1991

Considerations for the Isolation of Large Molecules (Proteins and Oligonucleotides) by High Performance Capillary Electrophoresis, oral presentation, CE Short Course, Rutgers University, Feb. 1991.

Quantitative Aspects of Laser Desorption Ionization Mass Monitoring for Proteins and Peptides, Part I: Poster Protein Society Meeting, July 1992, San Diego, CA

Quantitative Aspects of Laser Desorption Ionization Mass Monitoring for Proteins and Peptides, Part II; Poster, Biological Mass Spectrometry Meeting, September, 1992, Kyoto Japan

Confirmation of Peptide/Protein Primary Sequence by MALDI-TOF MS, oral presentation at the Pittsburgh Conference and Exposition on Analytical Chemistry and Applied Spectroscopy, Atlanta, Georgia, USA, March 3 – 8, 1993

Identification of Cystine-Cystine Bond Formation in Peptides by Combining Endopeptidase Activity with MALDI-TOF MS Analysis, oral presentation at the American Association of Pharmaceutical Scientist, 1993 Western Regional Meeting, San Francisco, California

An Evaluation of Crystallization Methods for Matrix Assisted Laser Desorption / Ionization of Peptides, oral presentation at the 41st ASMS Conference on Mass Spectrometry and Allied Topics, San Francisco, California, May, 1993

Analysis of Peptide Digests by Matrix-Assisted Laser Desorption/Ionization Time-of-Flight Mass Spectrometry, poster presented at the 7th Symposium of the Protein Society, San Diego, Ca., July 24 – 28, 1993

A Comparative Study on the Separation and Identification of Peptides by Capillary Zone Electrophoresis and Matrix-Assisted Laser Desorption/Ionization Mass Monitoring, Part One; oral presentation at the Capillary electrophoresis Conference Meeting, Frederick, MD, 1993

A Comparative Study on the Separation and Identification of Peptides by Capillary Zone Electrophoresis and Matrix-Assisted Laser Desorption/Ionization Mass Monitoring, Part Two, oral presentation at the Fifth BCEIA and Third Sino-Germany Seminar on Chromatography, October 9 – 12, 1993, Beijing, China

An Improved Method for the Analysis of Oligonucleotides by Matrix-Assisted Laser Desorption/Ionization Time-of-Flight Mass Spectrometry, poster presentation at the Fifth BCEIA and Third Sino-Germany Seminar on Chromatography, October 9 – 12, 1993, Beijing, China

Enhancing Resolution in Linear MALDI-TOF MS, poster presentation at the 43rd ASMS Conference on Mass Spectrometry and Allied Topics, Atlanta, Georgia, 1995

Utilization of MALDI Fast Metastable Decay Ions for Peptide/Protein Sequencing, Bob Brown, Duane Reiber, Rich Kornfeld, James Kenney, Scot Weinberger, oral presentation at the Pittsburgh Conference, Chicago, Illinois, 1996

Novel Approaches to the Application of MALDI-TOFMS to Synthetic Polymer Systems, Robert Liukkonen, Borris Rozynov, Martha Sarpony, Scot Weinberger, Rich Kornfeld, Alex Schilling, oral presentation at the Pittsburgh Conference, Chicago, Illinois, 1996

Time Lag Focusing MALDI-TOF MS for High Resolution and High Mass Accuracy Measurement of Biopolymers, David Schriemer, Randy Whittal, Liang Li, Yuqin Dai, Larry Russon, Scot Weinberger, Richard Kornfeld, oral presentation at the Pittsburgh Conference, Chicago, Illinois, 1996

Further Resolution Improvements in Linear Matrix-Assisted Laser Desorption/Ionization TOF MS, poster at the 44th ASMS Conference on Mass Spectrometry and Allied Topics, Portland, Oregon, 1996

Study of the Mass Measurement Accuracy of a Time-Lag-Focusing MALDI TOF MS System, poster at the 44th ASMS Conference on Mass Spectrometry and Allied Topics, Portland, Oregon, 1996

Examination of the Use of MALDI In-Source Decay for Sequencing of Peptides, poster at the 44th ASMS Conference on Mass Spectrometry and Allied Topics, Portland Oregon, 1996.

Protein Sequencing Strategies Based Upon Enzymatic Cleavage and MALDI In-Source Decay, Duane Reiber, Robert Brown, Scot Weinberger, poster at the 45th ASMS Conference on Mass Spectrometry and Allied Topics

ProteinChip™ Array Strategies for Differential Protein Display: Retentate Maps of Molecular Recognition Diversity, Scot R. Weinberger, Tai-Tung Yip, Bradley J. Thatcher, Thang Pham, T. William Hutchens, 1999 American Chemical Society Meeting, Anaheim California.

ProteinChip™ Technologies for Phenotypic Investigation and Biomarker Discovery, oral presentation, 15th Asilomar Conference on Mass Spectrometry and Proteomics, October, 1999

ProteinChip™ Technologies for Phenotypic Investigation and Biomarker Discovery, oral presentation, 19th International Symposium on the Separation of Proteins, Peptides and Polynucleotides, October, 1999

ProteinChip™ Technologies for Phenotypic Studies, oral presentation, International Business Communications Symposium, The Use of Mass Spectrometry in Proteomics, oral presentation, December, 1999.
ProteinChip® Array Analysis for Rapid Discovery and Identification of Novel Protein Biomarkers of Disease and Toxicity, oral presentation, Recent Advancements in Proteomics, Joint Stony Brook / Brookhaven National Laboratory Symposium on Molecular Biology, Stony Brook, New York, May, 2000

Surface Enhanced Laser Desorption / Ionization (SELDI) Approaches for Biomarker Discovery and Characterization, oral presentation, the 48th ASMS Conference on Mass Spectrometry and Allied Topics, Long Beach, California, June, 2000

Sensitive Detection and Characterization of Repifermin by SELDI ProteinChip® Time-of-Flight Mass Spectrometry, oral presentation, the 48th ASMS Conference on Mass Spectrometry and Allied Topics, Long Beach, California, June, 2000

Improved Laser and Ion Optics for SELDI and MALDI Mass Spectrometers, S. E. "Bud" Buttrill, Jr., Scot Weinberger, Ray Bryan, poster, the 48th ASMS Conference on Mass Spectrometry and Allied Topics, Long Beach, California, June, 2000

How Much Mass Accuracy is Enough to Identify a Protein Using MALDI-TOF MS Peptide Mapping, Scot R. Weinberger, Ron Orlando, J Shaun McLeond, poster, the 48th ASMS Conference on Mass Spectrometry and Allied Topics, Long Beach, California, June, 2000

Identification of Collagen Binding Proteins in Lactobacillus Using Advanced ProteinChip® Technology, B.J. Thatcher, S. Warder, S. R. Weinberger, J. C. Howard, poster, 14th Symposium of the Protein Society, San Diego , California, August , 2000

Characterizing the Repifermin / FGFR-2 IIIb Ligand / Receptor System Using ProteinChip® Array, SELDI-TOF MS Analysis, oral presentation, 15th International Mass Spectrometry Conference, Barcelona, Spain, August 2000.